

February 22, 2022

Freetown Planning Board and
Freetown Conservation Commission
3 North Main Street
Assonet, MA 02702

Re: Costa Drive Solar Peer Review Letter #1a, Dated 01/20/2022

Dear Board Members & Commissioners,

We have received and reviewed comments from Environmental Partners on the proposed solar array and accompanying stormwater treatment design at 5 and 0 Rear Costa Drive. The following is our response to the comments on behalf of Costa Solar, LLC c/o Ironwood Renewables, LLC. The site plans and Drainage Report have been revised according to the feedback we received, which will be included with this letter. We have responded to each comment below explaining what necessary changes have been made and/or our justification for the design assumptions used.

Notice of Intent Application

1. 25-foot No Touch – The Conservation Commission’s policy is for Applicants to provide a no disturb area within 25 feet of wetlands. The Applicant should indicate the limits of the 25-foot No Touch area on the plans, minimize or eliminate disturbances, and provide further explanation of any remaining disturbances. There appears to be tree clearing, vegetation management, gravel access road, emergency access roads, fencing, stormwater BMPs, battery energy storage system, and temporary staging areas proposed within the No Touch area.

Impacts within the 25-foot No-Touch Area have been minimized to the extent practical and those impacts have been discussed with the Conservation Commission. Further, updates have been made to the plan to further minimize impacts such as tree-clearing in this area. The limits of the 25-foot No-Touch Area have been added to the plans.

2. Sediment Control Barrier – The “Typical Wattle Sediment Control” and “Typical Wattle Check Dam Detail” details on sheet C-3.02 indicate that the wattles can range from 5-inches to 12-inches in diameter. We recommend a minimum wattle diameter of 12-inches for all uses.

Details on Sheet C-3.02 have been updated to reflect the use of 12” SiltSoxx

3. The Applicant should provide additional detail on the proposed access road around the arrays for emergency services. The plans indicate that these emergency access roads will not be paved or graveled. The emergency access roads are located outside of the proposed fencing and pass close to the wetland resource areas in many locations. The Applicant should indicate how the emergency access roads will be marked and maintained to prevent vehicles from diverging from the path and causing further disturbances to the site and resource areas. In addition, the Applicant should confirm that additional grading is not required to provide vehicle passage.

The proposed access shown around the array is not intended to be a road. This area will be maintained as a meadow, similar to other open areas within the project limits. The purpose of showing this access area on the plan is to confirm that there is space for access around the entirety of the site with an off-road or 4x4 vehicle.

4. The Applicant should update the "Clearing Notes" on sheet C-1.02 to include a description of the vegetation management areas.

The Clearing Notes on Sheet C-1.02 have been updated with a description of the location of the Vegetation Management Areas.

5. 100-foot Buffer Zone – The Applicant should indicate the limit of the 100-foot Wetland Resource Area buffer zone on sheets C-1.04 and C-1.05. It appears the proposed transformer for the eastern array and battery energy storage system are located within the 100-foot buffer zone.

The limits of the 100-foot Wetland Resource Area have been added to the site plan sheet. The battery system is centrally located in the site for access and to minimize disturbances to the neighbors. The battery system is close to a non-jurisdictional wetland which is shown with a 100-foot buffer zone but is not regulated based on the wetland characteristics.

6. Riverfront Area – The Applicant indicates that there will be impacts to the Riverfront Area on the WPA Form 3 and indicates the limits of the 200-foot Riverfront Area on the plans. The Applicant should also indicate the limits of the 100-foot Riverfront Area on the plans.

The limits of the 100-foot Riverfront Area have been added to the plans. There is no work proposed within 100 feet of the river. The project LOD is entirely outside of the 100' buffer.

Stormwater Management Standards

1. Standard 2 – The Applicant indicates that the proposed design will not result in additional off-site flooding and will post-construction peak discharge rates will not exceed pre-construction rates. We have the following comments on the HydroCAD calculations that may impact the peak rates of runoff: a. Curve Number – The Applicant should confirm whether the proposed impervious areas include the proposed gravel access road, all equipment pads, and solar array supports for all post-construction subcatchments. In particular, it is unclear how gravel access roads are treated in the calculations.

The proposed gravel access roads were treated as impervious for the purposes of calculating stormwater runoff with a curve number of 98. This is stated in Section 5 (Page 4) of the Drainage Report, dated January 10th, 2022 and revised February 22, 2022.

b. Curve Number – The Applicant includes a small area of Woods (Good, HSG A) in the Area Listing for post-construction subcatchment P2B, however the plans show the entire subcatchment will be cleared. The Applicant should indicate where this section of woods is located on the plans, or revise the subcatchment curve number accordingly.

A small portion of woods is proposed to remain immediately adjacent to the crossing of the railroad tracks in Watershed 2B within that watershed area. Please note that many of the watersheds have been adjusted to address other concerns within the peer review.

c. Time of Concentration – In accordance with TR-55 we recommend the Applicant use a minimum time of concentration of 6 minutes in their calculations for subcatchment P1B. However, we understand that by using a shorter time of concentration the Applicant’s calculations are conservative.

The HydroCAD model and subsequent runoff calculations have been updated to reflect a minimum Time of Concentration of 6 minutes. The project only uses the minimum time of concentration on one small watershed.

d. Sheet Flow – The Applicant generally classifies the first 150 feet of runoff in a subcatchment as sheet flow in the calculations. In accordance with the Hydrology Handbook for Conservation Commissions, we recommend the Applicant use a maximum length of 50 feet for sheet flow in their pre-construction and post-construction calculations. Generally, beyond 50 feet sheet flow transitions to shallow concentrated flow.

The HydroCAD model and subsequent runoff calculations have been updated to reflect a maximum sheet flow distance of 50 feet. This was performed for both pre and post development calculations.

e. Sheet Flow – The Applicant uses a Manning’s n-value of 0.400 for wooded areas and within the proposed solar arrays. In HydroCAD, a Manning’s n-value of 0.400 corresponds to sheet flow in wooded areas with light underbrush; we agree that this can be used to model sheet flow within existing wooded areas. However, we recommend the Applicant use a Manning’s n-value of 0.240 corresponding to sheet flow in dense grass to model flow within the solar arrays (subcatchments P1D, P1E, P1F, P2A, P2B, P3).

The open areas of the solar array are proposed to be mowed no more than two times per year and maintained as a meadow. It is our opinion that the ground cover of the solar array would not be accurately represented by modeling those areas as Dense Grass with a Manning’s n-value of 0.240. The grasses and their Manning’s numbers in HydroCAD are based on being managed and mowed like a residential lawn. Unfortunately, meadow is not one of the very limited options in HydroCAD, our opinion is the meadow areas are more suited to be modeled as equal, if not better than, the existing forested condition on site. Below are images we took from similar sites as a representative example of the post-construction ground cover that will be achieved. The bottom edge of the panels in these photos are 3.5 to 4 feet from the ground, it is expected the meadow on this project will reach a similar height and robustness. Again, please note that many of the watersheds have been adjusted.



f. Channel Flow – The Applicant uses a Manning’s n-value of 0.100 corresponding to “earth, dense brush, high stage” for the proposed grassed swales (subcatchments P1B, P1C, P1D, and P1E). This n-value is high for straight grassed swales that will be maintained, and this could result in low rates of runoff. We recommend using an n-value of 0.030 corresponding to “earth, grassed & winding” channels. For example, the Applicant uses an n-value of 0.07 corresponding to “sluggish, weedy reaches with pools” for the unnamed tributaries to Fall Brook, which we concur corresponds to those natural channels.

The HydroCAD model has been updated to incorporate this change to all watersheds. Watershed P1B has been updated to reflect the minimum Time of Concentration of 6 minutes as recommended in Stormwater Management Standards, Comment 1.c above. Channelized flow does not result in long times of concentration, so this had little effect on the model.

g. Shallow Concentrated Flow – The Applicant uses a velocity factor of 5 fps for shallow concentrated flow within wooded areas and within the proposed solar arrays. In HydroCAD, a velocity factor of 5 fps corresponds to shallow concentrated flow within woodlands; we agree that this can be used to model flow within existing wooded areas. However, we recommend the Applicant use a velocity factor of 7 fps corresponding to shallow concentrated flow in short grass pastures to model flow within the solar arrays (subcatchments P1D, P1E, P1F, P2A, P2B, P3).

Again, these areas will be maintained as robust meadow. Please refer to our explanation and photo examples within comment 1.e.

2. Standard 3 – Per Volume 2 Chapter 2 of the MA Stormwater Handbook, the Applicant should provide calculations to demonstrate that the infiltration BMP has been sized to drain and exfiltrate within 72 hours following precipitation events.

The output of the HydroCAD model shows that the Infiltration Basin completely drains all runoff within 48 hours of a 100-year storm event. See Appendix B of the Drainage Report, all stormwater is infiltrated or outflowed by hour 46 of the storm event. Furthermore, this assumes a very small hydraulic conductivity of 1.42 in/hr. The project will perform testing prior to construction any revisions will be made at that time, it is expected the hydraulic conductivity will be faster.

3. Standard 4 – The Applicant should provide calculations demonstrating that the infiltration BMPs, including the ponds associated with the level lip spreaders, are sized to capture the required Water Quality Volume and that the systems have been designed to remove 80% TSS. Although there is limited impervious area, typically solar developers provide these calculations.

More than 80% of the runoff area from the proposed gravel access roads and project equipment will flow through the Grass-Lined Swales, sediment forebays, and the Stormwater BMPs. All these management practices will act as pre-treatment for the storm events. During the Water-Quality Storm (1" of rainfall), there is nominal to no runoff leaving the best management practices on site. Meaning the water quality storm is held onsite and allowed to infiltrate, evaporate or at a minimum allow total suspended solids to settle. The HydroCAD results for the Water Quality Storm have been added to Appendix B of the updated Drainage Report, dated February 22, 2022.

4. Standard 6 – Refer to MassDEP comment 1, below.

See response to MassDEP Comment 1.

5. Standard 8 – The Applicant provided a draft Stormwater Pollution Prevention Plan (SWPPP). We recommend the Planning Board/Conservation Commission require the submittal and approval of the final SWPPP as a condition of approval. We recommend the final SWPPP be submitted to the Planning Board/Conservation Commission one month prior to the beginning of construction to allow the Board/Commission to review and comment on the SWPPP. We also recommend the Board/Commission require, as a condition of any approval, that SWPPP inspections be performed consistent with the requirements of the NPDES Construction General Permit and that copies of all SWPPP reports be submitted to the Town of Freetown.

We have no objection to this being a condition of the permit.

6. Standard 9 – The Applicant should update the post-construction Operations and Maintenance Plan to include: a schedule for performing routine and non-routine maintenance tasks; a plan showing the location of stormwater BMPs, their access roads, and locations for stockpiling snow; a description and delineation of the public safety features; an estimated operations and maintenance budget for the stormwater BMPs; and an operations and maintenance log form for the stormwater BMPs.

We have no objection to this being a condition of the permit.

7. Standard 9 - We recommend that yearly Operation and Maintenance reports be provided to the Town. The EPA, through the Small Municipal Separate Storm Sewer System (MS4) permit, is requiring that ongoing maintenance of private stormwater management systems be performed regularly and documented.

We have no objection to this being a condition of the permit.

8. Standard 10 – The Applicant indicates that an interim Illicit Discharge Compliance Statement will be provided prior to construction and a final statement will be provided upon the completion of construction. We recommend the Planning Board/Conservation Commission require the submittal of the final Illicit Discharge Compliance Statement as a condition of approval.

We have no objection to this being a condition of the permit.

9. The Applicant submitted a waiver request from the Town of Freetown, Massachusetts Rules and Regulations of the Planning Board Governing the Subdivision of Land, Section III – Procedures for Submission and Approval of Plans, paragraph 2. Contents, Item r, to complete soil and groundwater investigations for drainage facilities. However, in accordance with the Massachusetts Stormwater Handbook, we recommend the Applicant complete and submit test pit logs for all test pits completed on site to verify separation from seasonal high groundwater and soil textural classification for infiltration rates within infiltration BMPs.

We have no objection to this being a condition of the permit.

10. Level Lip Spreaders – The Applicant should provide clarification on the following items related to the level lip spreaders (LS#) and their associated storage ponds.

The re-designed Stormwater design no longer proposes the use of Level Lip Spreaders. Therefore, comments 10.a through 10.e are no longer applicable. We replaced these spreaders with large Dry-Basins. These basins will have a small orifice at the bottom to continuously drain the basins. These basins will be used strictly for flood control in the larger storm events and are not designed for infiltration.

11. The Applicant should label all time of concentration flow paths indicating length, surface cover, and slope on sheets C-1.01 and C-1.03.

We attempted to make this change to the plans but find that it severely affects the legibility of the other notes and callouts and the plans overall. The information regarding the time of concentration for each watershed can be found in the HydroCAD reports in Appendix B.

12. The Applicant should provide additional contour labels for existing and proposed contours to clarify grading and proposed stormwater BMPs.

The plans have been updated to incorporate this change as much as possible.

13. The Applicant should provide sizing calculations for the swales, sediment forebay, and culverts.

Sizing calculations for the swales, sediment forebays and culverts have been provided. In the Drainage Report.

General Comments

1. The Applicant indicates proposed locations for temporary staging areas within and adjacent to the proposed arrays. The Applicant should also indicate parking and staging areas that will be used at the start of construction for clearing the access road off Costa Drive, as this is a residential neighborhood.

Additional staging area has been added adjacent to the project entrance. This area will be used for parking and staging at the beginning of construction while the access road and wetland crossing are being completed. Once the wetland has been crossed, this area will be used as parking for the remainder of construction.

2. The Applicant should provide sound level data for all pad mounted equipment and battery energy storage system. In addition, describe any measures designed to minimize sound impacts to abutters.

A sound study is not required as part of the Town submission. If the Town requires a sound analysis, we can create a basic sound evaluation which shows noise dampening based strictly on mathematical dampening equations using distance. It is our experience that the sound impacts generated from a solar project are generally negligible. The equipment used typically produce sound in the <65 dB range at a distance of 1 meter, and the sound generated dissipates quickly. At a distance of ~150 – 200 feet from the project equipment the sound generated becomes indistinguishable from background noise.

MassDEP Comments

1. Project is located in an ORW. The Stormwater Regulations at [310 CMR 10.05(6)(k)6.] require the use of specific source control, pollution prevention measures and structural stormwater best management practices for managing discharges to critical areas. Stormwater discharges to Zone A are prohibited

unless essential to the operation of a Public Water Supply. However, according to the plans provided, Dry Basin 1 and other stormwater management structures appear to be partially located in the Zone A which is prohibited. The Proponent is required to verify that these structures and their overflow discharge are not located in the Zone A. This may require revising the current Stormwater Report and providing new stormwater calculations for this basin.

The Applicant has revised the plans to eliminate Dry Basin 1 and the level lip spreaders from the Zone A; the proposed infiltration basin is located outside of the Zone A. The Applicant does show "stone dispersion pad/check dams" within the Zone A. The Applicant should confirm that the proposed "stone dispersion pad/check dams" are approved for stormwater discharges to or near the Zone A (Volume 1, Chapter 1, Table CA2). Additionally, the Applicant should confirm that the "stone dispersion pad/check dams" will not result in erosion to the wetlands in accordance with Standard 1. The Applicant should indicate if the "stone dispersion pad/check dams" are a permanent stormwater BMP or a construction period BMP and provide a detail.

The stone dispersion pads/ check dams shown on the plan are used as best management practices (BMPs) during construction to minimize the chance of erosion and sediments leaving the project site. They will be removed post construction and once robust meadow vegetation is achieved within the area up gradient of the BMPs.

2. The applicant must also address the requirement to use a span or other bridging technique in accordance with 314 CMR 9.06(3)(f), in lieu of the discharge of fill material to an ORW. The Applicant has adjusted the layout of the gravel access road since the submission to MassDEP. The initial submission included a gravel access road to the north of the western solar array extending approximately 800 feet through the Zone A. The revised submission proposes a gravel access road through the western array resulting in a section approximately 300 feet long passing through the Zone A, which requires grading for the roadway and side slopes. The Applicant should confirm if impacts to the Zone A may be limited further by rerouting the gravel access road completely outside of the Zone A, or demonstrate compliance with 314 CMR 9.06(3)(f) as requested by MassDEP.

The relocation of this roadway was performed and has re-route the project watershed entirely away from Zone A and will send flows into the infiltration basin on site. By making this adjustment this the project has completely removed the need for direct stormwater discharge into Zone A. No discharge of dredge or fill material is proposed within an Outstanding Resource Water associated with the project. Site alterations have been limited to only what it necessary and required to build and operate the project and existing infrastructure is being used to the greatest extent practicable to further reduce impacts.

Additionally, the proposed unmaintained access road around the western array for emergency services is located within the Zone A. The Applicant should confirm that additional grading is not required to provide vehicle passage along the unmaintained access road, resulting in additional impacts to the Zone A. Similarly, the Applicant should demonstrate compliance with 314 CMR 9.06(3)(f) as requested by MassDEP.

Please see note #3 in Notice of Intent section of this response. This area is not a constructed or maintained road, this represents a vegetated access way free of woody vegetation for emergency access only that may be utilized by overland equipment.

3. In addition, a wildlife habitat evaluation is required per 310 CMR 10.58(4)(d)1.c., a copy of which must be sent to the Department, attention: Maissoun Reda.

The wildlife habitat evaluation has been developed and submitted to Maissoun Reda as requested.

Thank you for your time reviewing the project. Please reach out if there is any additional comments, questions, or concerns.

Sincerely,



Greg Dixon, P.E. MA #55649
Krebs and Lansing Consulting Engineers, Inc.

cc: Adam S. Kran, P.E. – Environmental Partners Group, LLC
Maria E. Proulx, P.E. – Environmental Partners Group, LLC
Town of Freetown – Planning and Zoning
Town of Freetown – Conservation Commission